

| 課程資訊 (Course Information) | | | | | |
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| 科號 Course Number | 10610CS 233401 | 學分 Credit | 3 | 人數限制 Size of Limit | 90 |
| 中文名稱 Course Title | 線性代數 | | | | |
| 英文名稱 Course English Title | Linear Algebra | | | | |
| 任課教師 Instructor | 陳朝欽(CHEN, CHAUR-CHIN) | | | | |
| 上課時間 Time | M3M4W2 | 上課教室 Room | DELTA台達103 | | |
| <p>提醒您：請遵守智慧財產權，勿使用非法影印教科書</p> <p>Please respect the intellectual property rights, do not use illegal copies of textbooks.</p> | | | | | |
| 此科目對應之系所課程規畫所欲培養之核心能力 Core capability to be cultivated by this course | <ul style="list-style-type: none"> ■ 具有設計與操作實驗以及分析、解釋數據的能力。(1%) To be able to design and perform experimentation as well as analyze and explain the experiment data. (1%) ■ 具有發現問題、定義問題、並設計程式以解決問題的能力。(2%) To have the ability to discover problems, define them, and design computer programs to solve problems. (2%) ■ 具有資訊、數學及科學的基礎知識。(20%) To have fundamental knowledge of computer science, mathematics, and science. (20%) ■ 具有分析、設計、開發、整合、測試、與評估資訊系統、元件、或演算法的能力。(2%) To be able to analyze, design, develop, integrate, test, and evaluate systems, components, and algorithms of computer science. (2%) ■ 具有良好的溝通技巧與跨領域團隊合作的能力。(20%) To have good communication skills and be able to cooperate with others in interdisciplinary teams. (20%) ■ 瞭解與資訊相關之產業脈動與最新的資訊科技進展。(5%) To understand the most recent technological and industrial advancements regarding computer science. (5%) ■ 瞭解資訊科技對於全球性社會、經濟、文化等層面的影響與責任。(10%) To understand the social, economical, cultural effects of computer science and related technologies on the global level. (10%) ■ 瞭解國際視野及終身學習的重要性。(30%) To understand the importance of international view as well as lifelong education. (30%) ■ 尊重學術、工程倫理、及智慧財產權。(10%) To respect academics, engineering ethics, and intellectual property. (10%) | | | | |
| 課程簡述 (Brief course description) | | | | | |
| <p>The objective of this course is to prepare the students for solving a linear system of equations: $Ax=b$ by $PA=LU$ decomposition using Gaussian elimination with partial pivoting and back substitution; to learn vector space, inner product, projection, orthogonal bases in a vector space and linear transform; to be familiar with the properties of matrices such as eigenvalues/eigenvectors, singular values/vectors; to know spectrum decomposition and singular value decomposition. MATLAB will be introduced and used for better understanding linear algebra. Some applications in image analysis and cryptography may be introduced.</p> | | | | | |
| 課程大綱 (Syllabus) | | | | | |
| <p>一、課程說明(Course Description)</p> <p>The objective of this course is to prepare the students for solving a linear system of equations: $Ax=b$ by $PA=LU$ decomposition using Gaussian elimination with partial pivoting and back substitution; to learn vector space, inner product, projection, orthogonal bases in a vector space and linear transform; to be familiar with the properties of matrices such as eigenvalues/eigenvectors, singular values/vectors; to know spectrum decomposition and singular value decomposition. MATLAB will be introduced and used for better understanding linear algebra. Some applications in image analysis and cryptography may be introduced.</p> | | | | | |

二、指定用書(Text Books)

[0] To be announced in class

[1] Supplementary materials are available from my website

<http://www.cs.nthu.edu.tw/~cchen>

三、參考書籍(References)

[1] H. Anton and C. Rorres, Elementary Linear Algebra (11e, 2015)

[2] G. Strang, Linear Algebra and Its Applications (4e, 2006)

[3] D. Hanselman and B. Littlefield, Mastering Matlab 8 (2012)

[4] S.J. Leon, Linear Algebra with Applications (9e, 2015)

More references are put in

<http://www.cs.nthu.edu.tw/~cchen/CS2334/cs2334.html>

四、教學方式(Teaching Method)

[1] Lectures by using slides (pdf files) and blackboard.

[2] Students are encouraged to raise questions in class.

[3] A review will be given before each Exam.

[4] Some seminars in related applications will be suggested.

All lecture notes and handouts are written in English, the lectures are mainly given in Chinese Mandarin, but you can ask questions in either English or Mandarin.

五、教學進度(Syllabus)

1. Introduction (2 hrs)

2. Matrices and Linear Equations (8 hrs)

3. Determinants (3 hrs)

4. Vector Spaces and Linear Transform (9 hrs)

5. Orthogonality (6 hrs)

6. Eigenvalues and Eigenvectors (8 hrs)

7. Numerical Linear Algebra (2 hrs)

[*] Hour review will be given before each 100-minute exam.

六、成績考核(Evaluation)

Quizzes and Class Attendance: 10%

Exams: 90%

Class Attendance is important.

Do not take more than 19 credits.

Spare at least 7 hours in addition to classes for review per week

七、可連結之網頁位址

<http://www.cs.nthu.edu.tw/~cchen/CS2334/cs2334.html>